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STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

MEMORANDUM

DATE: July 10, 1989

TO: Sam Brenneke, Lab Services Program, DEQ

FROM: MLR
Myrna L. Reiff, Geologist, Engineering/Environmental Geology, DGLS

SUBJECT: Eisenberg Fill Area PA/SI

Following my site reconnaissance visit on June 27, 1989, I conducted a quick literature search of pertinent geologic and hydrologic information for the subject site.

The site is located on the Missouri River floodplain in an industrial area a short distance east of Interstate 29 and 35 in North Kansas City, Missouri. The topographic surface of the floodplain is nearly level. It is expected that the thickness of alluvial material above bedrock is in the range of 70 to 140 feet, averaging 85 to 90 feet. Variations in thickness of alluvium is controlled by irregularities in the bedrock surface. The composition of the alluvium varies from highly permeable coarse materials (sand and gravel about 60 feet thick) above bedrock to finer sand (about 60 feet thick) which is overlain by slowly permeable silty clay and clay (CL and CH) about 3 feet thick of possible colluvial/glacial origin near the original surface. It is estimated that 10 ± feet of fill material composed of concrete, brick, iron, rebar and fine-grained soil, has been placed upon the natural soils. Bedrock was not observed at the site, because of the thick alluvial cover. Data from the Missouri Highway Department bridge exploration at Highway 210 and the Norfolk and Western Railroad indicates that bedrock in this area is slowly permeable shale probably of Pennsylvanian age. This shale unit would be expected to act as an aquitard, thus limiting downward movement of groundwater into the deeper groundwater system.

Since the site is located on the Missouri River floodplain, it is also considered to be in the Missouri River watershed. There is a definite hydrologic connection between the alluvium and the river. The main groundwater discharge is seepage from the aquifer to the Missouri River. The alluvial aquifer is in turn recharged by the Missouri River especially during prolonged high-river stages. The dominant regional groundwater flow direction is toward the south and the Missouri River from the surrounding uplands and bedrock areas. The groundwater flow direction in the alluvial deposits varies, generally depending upon the time of year. The direction of groundwater movement may be reversed during periods of prolonged high-river stage when the alluvial aquifer is recharged. In general, the greatest amount of fluctuation occurs in areas nearest to the river and would not be expected to change very much at the subject site

because it is about a mile from the river.

The water table is expected to be from 15 to 30 feet below the natural surface. A seasonal (winter and spring) high water table of 1 t 3 feet of depth in the natural soils is reported to occur in this area, according to the Soil Survey of Clay and Ray Counties.

The Missouri River alluvium is the major aquifer in northwest Missouri. Large quantities of water are obtainable from the saturated sand and gravel of the alluvium. Groundwater in the alluvial aquifer occurs under water table (unconfined) and artesian (confined) conditions. These conditions vary in location and over time. Deep bedrock groundwater in Pennsylvanian-aged rock is highly mineralized and is non-potable.

This site is a good candidate for the installation of a groundwater monitoring system. I would be glad to help in preparing contract specifications for a monitoring system, should the decision be made to install wells.

I recommend that water samples be taken from the ponded water at the site. Soil samples may be obtained adjacent to the ponded water and in the surrounding area using power driven equipment or grab samples of the fine-grained portion of the fill. Drilling through the fill will be difficult. Below the fill, drilling should be easier to a depth of 50-70 feet where gravel may be encountered.

In summary, the following general site conditions have been established. The subject site is located on the Missouri River floodplain which is the largest potential source of fresh groundwater in northwestern Missouri. The soils at the site are thick saturated alluvial materials grading upward from highly permeable sand and gravel at the base to sand, to slowly permeable silty clay and clay and permeable fill at the surface. Bedrock is composed of slowly permeable Pennsylvanian-aged shale which contains highly mineralized groundwater. Because of the permeable nature of the alluvium, the alluvial aquifer is potentially at risk at the site.

cc: John Madras, DEQ
cc: Jim Armes, DEQ
cc: Larry Alderson, DEQ